JC915 U.S. PTO 09/29/00

10-200   A

Please type a plus sign (+) inside this box → [+]

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.	1662-28600 (P99-2749)
First Inventor or Application Identifier	Adrian CRISAN
Title	Automatic System Configuration Management
Express Mail Label No.	EL705960627US

09/675532   09/29/00

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. [✔] * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)

2. [✔] Specification   [Total Pages 16]
(preferred arrangement set forth below)
- Descriptive title of the Invention   (plus cover sheet)
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. [✔] Drawing(s) (35 U.S.C. 113)   [Total Sheets 3]

4. Oath or Declaration   [Total Pages 1]
a. [✔] Newly executed (original or copy)
b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
i. [ ] DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

*NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

5. [ ] Microfiche Computer Program (Appendix)

6. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. [ ] Computer Readable Copy
b. [ ] Paper Copy (identical to computer copy)
c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. [✔] Assignment Papers (cover sheet & document(s))
8. [ ] 37 C.F.R.§3.73(b) Statement (when there is an assignee)   [✔] Power of Attorney
9. [ ] English Translation Document (if applicable)
10. [ ] Information Disclosure Statement (IDS)/PTO-1449   [ ] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [✔] Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
13. [ ] * Small Entity Statement(s) (PTO/SB/09-12)   [ ] Statement filed in prior application, Status still proper and desired
14. [ ] Certified Copy of Priority Document(s) (if foreign priority is claimed)
15. [ ] Other: ....

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment

[ ] Continuation   [ ] Divisional   [ ] Continuation-in-part (CIP)   of prior application No. _____/_____

Prior application information.   Examiner _____   Group / Art Unit: _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

[ ] Customer Number or Bar Code Label   : 23505 :   or [✔] Correspondence address below
(Insert Customer No. or Attach bar code label here)

Name	Jonathan M. Harris
	Conley, Rose & Tayon, P.C.
Address	PO Box 3267
City	Houston
State	TX
Zip Code	77253-3267
Country	USA
Telephone	713-238-8000
Fax	713-238-8008

| Name (Print/Type) | Michael F. Heim | Registration No. (Attorney/Agent) | 32,702 |
| Signature | *Michael F. Heim* | Date | September 29, 2000 |

M:\C\1662\28600\PTO TRANS 01

PTO/SB/17 (12/99)
Approved for use through 09/30/2000. OMB 0651-0032
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FEE TRANSMITTAL
for FY 2000
Patent fees are subject to annual revision.
Small Entity payments *must* be supported by a small entity statement,
otherwise large entity fees must be paid. See Forms PTO/SB/09-12.
See 37 C.F.R. §§ 1.27 and 1.28.

Complete if Known	
Application Number	NOT YET ASSIGNED
Filing Date	CONCURRENTLY HEREWITH
First Named Inventor	Adrian CRISAN
Examiner Name	UNKNOWN
Group / Art Unit	UNKOWN

TOTAL AMOUNT OF PAYMENT	($)	802.00	Attorney Docket No.	1662-28600 (P99-2749)

METHOD OF PAYMENT (check one)

1. ☑ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit Account Number: 03-2630

Deposit Account Name: Compaq Computer Corporation

☑ Charge Any Additional Fee Required Under 37 CFR §§ 1 16 and 1 17

2. ☐ Payment Enclosed:
☐ Check ☐ Money Order ☐ Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee ($)	Fee Code	Fee ($)		
101	690	201	345	Utility filing fee	690.00
106	310	206	155	Design filing fee	
107	480	207	240	Plant filing fee	
108	690	208	345	Reissue filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) ($) 690.00

2. EXTRA CLAIM FEES

		Extra Claims	Fee from below	Fee Paid
Total Claims	24	-20** = 4	X 18.00 =	72.00
Independent Claims	2	- 3** = -0-	X 78.00 =	00.00
Multiple Dependent			=	00.00

**or number previously paid, if greater; For Reissues, see below*

Large Entity		Small Entity		Fee Description
Fee Code	Fee ($)	Fee Code	Fee ($)	
103	18	203	9	Claims in excess of 20
102	78	202	39	Independent claims in excess of 3
104	260	204	130	Multiple dependent claim, if not paid
109	78	209	39	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 72.00

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee ($)	Fee Code	Fee ($)		
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	380	216	190	Extension for reply within second month	
117	870	217	435	Extension for reply within third month	
118	1,360	218	680	Extension for reply within fourth month	
128	1,850	228	925	Extension for reply within fifth month	
119	300	219	150	Notice of Appeal	
120	300	220	150	Filing a brief in support of an appeal	
121	260	221	130	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,210	241	605	Petition to revive - unintentional	
142	1,210	242	605	Utility issue fee (or reissue)	
143	430	243	215	Design issue fee	
144	580	244	290	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	40.00
146	690	246	345	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	690	249	345	For each additional invention to be examined (37 CFR § 1.129(b))	

Other fee (specify) _____

Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 40.00

SUBMITTED BY

				Complete *(if applicable)*	
Name (Print/Type)	Michael F. Heim	Registration No. (Attorney/Agent)	32,702	Telephone	(713) 238-8000
Signature	*[signature]*			Date	September 29, 2000

WARNING:

Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Burden Hour Statement. This form is estimated to take 0 2 hours to complete. Time will vary depending upon the needs of the individual case Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231 DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO. Assistant Commissioner for Patents, Washington, DC 20231.

M \C\1662\28600\PTO FEE TRANS 01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION FOR UNITED STATES LETTERS PATENT

AUTOMATIC SYSTEM CONFIGURATION MANAGEMENT

By:

Adrian Crisan
13806 Quail Forest
Cypress, Texas 77429
Citizenship: U.S.A.

AUTOMATIC SYSTEM CONFIGURATION MANAGEMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention generally relates to configuring a computer system with software to improve the performance of the computer. More particularly, the invention relates to a technique for automatically managing the configuration of a computer system.

Background of the Invention

One persistent area of concern for users of computers is operational defects in the computer system to improve the performance of the computer. Operational defects in the context of this disclosure include software "bugs" and different software applications that, although operationally sound by themselves, experience problems when run in concert with other software applications. Further, some software programs do not work well with certain hardware components (e.g., scanners, network interface cards). Such problems can cause a system to perform at less than an

optimal level and even "crash" in certain situations. Often, the source of the particular problems is not immediately apparent to the user.

There are several techniques for addressing such problems. For instance, by tracking such problems, improvements can be made to software applications that cause a problem. Thus, as a software supplier develops a new version of its software, not only may new and improved featured be added, but corrections for bugs previously detected can be implemented as well. Further, developers of computer suppliers, operating systems, and software applications can make software "patches" available to the public, such as through their websites. Users can download a patch to correct a problem. Sometimes, multiple patches must be downloaded to correct a multitude of problems.

At least some problems a particular computer system experiences can be resolved by loading a different version of certain software applications. Typically, most computers users attempt to determine their optimum software configuration for their system through trial and error by loading and testing different versions of software. As such, different versions of software are tried until the user happens upon a particular software configuration that makes the entire system seem to perform the best. Even then, the user's computer still may not have the most optimal software load. Accordingly, it would be desirable to have a better way to make a computer system perform better.

BRIEF SUMMARY OF THE INVENTION

The problems noted above are solved in large part by an automatic configuration system that automatically analyzes a user's computer system configuration and recommends a more optimal configuration of components. The system determines the hardware and software

components currently contained in the user's computer including versions of hardware and software components. The system uses a knowledge base of previously identified problems to determine an overall problem index value for the user's particular configuration. Generally, the overall problem index value is indicative of the quantity and/or severity of the problems associated

5   with the user's computer caused by the software and hardware components individually or in connection with one another. The automatic configuration system then varies the configuration (*e.g.*, the versions of software) and determines a new overall problem index value for each variation. The system selects the configuration with the lowest overall problem index value, which generally will have the fewest and/or less severe problems and recommends that configuration to

10 the user.

BRIEF DESCRIPTION OF THE DRAWINGS

For a detailed description of the preferred embodiments of the invention, reference will now be made to the accompanying drawings in which:

15   Figure 1 shows a block diagram of a computer system constructed in accordance with the preferred embodiment;

Figure 2 shows a configuration management module and a knowledge base used to automatically determine an optimal configuration for a given computer system;

Figure 3 shows more detail of the knowledge base of Figure 2; and

20   Figure 4 shows the actions performed by the configuration management module of Figure 2.

NOTATION AND NOMENCLATURE

Certain terms are used throughout the following description and claims to refer to particular

system components. As one skilled in the art will appreciate, computer companies may refer to a

component by different names. This document does not intend to distinguish between components

5   that differ in name but not function. In the following discussion and in the claims, the terms

"including" and "comprising" are used in an open-ended fashion, and thus should be interpreted to

mean "including, but not limited to…". Also, the term "couple" or "couples" is intended to mean

either an indirect or direct electrical connection. Thus, if a first device couples to a second device,

that connection may be through a direct electrical connection, or through an indirect electrical

10   connection via other devices and connections.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to Figure 1, illustrates an exemplary architecture of a computer system 100.

Although the system 100 can be implemented with many other architectures, the embodiment

15   shown in Figure 1 is presented to aid in explaining the operation of a preferred embodiment of the

invention. Computer system 100 includes a CPU 102 coupled to a bridge logic device 106 via a

CPU bus 103. The bridge 106 also couples to a main memory array 104 by a memory bus 105,

and may further couple to a graphics controller 108 and display 109 via an accelerated graphics

port ("AGP") 107. The bridge 106 couples CPU 102, memory 104, and graphics controller 108 to

20   other peripheral devices in the system through a primary expansion bus ("BUS A") which may be

implemented as a peripheral component interconnect ("PCI") bus or an extended industry standard

architecture ("EISA") bus or any other desired bus. Various components that comply with the

communications protocol and electrical requirements of BUS A may reside on this bus, such as an audio device 114 and a network interface card ("NIC") 118.

If other secondary expansion buses are provided in the computer system, as is typically the case, another bridge logic device 112 is used to couple the primary expansion bus, BUS A, to a secondary expansion bus ("BUS B"). Various components that comply with the bus protocol of BUS B may reside on this bus, such as hard disk controller 122 which couples to a hard drive 130, a basic input/output system read only memory ("BIOS ROM") 124, an I/O controller 126, and a scanner 140. BIOS ROM 124 stores the system BIOS firmware that is executed by CPU 102 during system initialization. The I/O controller 126 typically interfaces to input/output devices such as a keyboard 136, a mouse 132, a floppy disk drive 128, and various other input and output devices as desired.

Referring still to Figure 1, hard drive 130 is shown with various software applications 142, 144, 146, 148, and 150 loaded onto it. Such applications may include anything the user desires such as a word processing program, a spread sheet program, accounting software, graphics drivers, printer drivers, and the like. One or more of these software applications or drivers may be available in different versions from the suppliers. Further, each of the hardware components shown may be available from different suppliers and different versions of the component from the same supplier. For example, the scanner 140 may be available in 4 or 5 different models from one supplier and 3 different models from another supplier. Further, various companies may supply suitable versions of graphics controllers 108. As noted above, various problems may occur as a result of interactions between particular versions of hardware components or software applications. In this disclosure, unless otherwise indicated, the term "component" includes both hardware devices and software.

In accordance with the preferred embodiment of the invention, a user's computer system is analyzed and, if the system can be made better (*i.e.*, perform better, experience fewer or less severe problems), one or more software version changes are recommended. This process preferably occurs automatically, thereby making it easier and quicker for a user to improve the performance

5   of the computer system.

Referring now to Figure 2, the preferred embodiment of the automatic configuration analysis and improvement mechanism includes a configuration management module 202 which interacts with a knowledge base 204. The configuration management module 202 generally analyzes a computer system's current configuration of hardware and software components 200

10   using the knowledge base 204 and recommends an improved configuration 206 to the user. The recommended configuration 206 may include such recommendations as different versions of the software the user already uses or new software altogether that the user should use. The recommended configuration generally will be one that will improve the performance of the computer system. Improved performance includes operating faster, experiencing fewer problems,

15   and/or experiencing less severe problems such as system lock-ups and crashes.

Referring now to Figure 3, the knowledge base 204 includes knowledge of hardware and software problems that have been previously determined to exist. Such problems are commonly recorded by computer companies. Many of these problems are caused by software applications provided by various third party software companies. Each entry in the knowledge base 204

20   preferably pertains to a particular hardware or software component or interaction 208 between hardware and/or software components. For each such interaction 208, a problem index 210 is determined, computed, or otherwise assigned to the combination of components. In addition, a comment field 212 is included in which free hand text can be entered describing the problem.

In general, the problem index 210 is a relative measure of the problems associated with the particular components. The index preferably takes into account (1) the number of problems that result from the interaction and (2) the severity of each problem. An interaction of components that results in a large number of problems preferably would have a higher relative problem index 210 than an interaction of different components with fewer problems. Further, problems that cause the entire computer system to crash are generally recognized as the most severe types of problem, while problems that merely cause an error with the way data is formatted are generally considered less severe. All else being equal, a system with more severe component interactions than another system would have a higher problem index. Accordingly, the problem index takes into account both the quantity of problems and their severity.

One of ordinary skill in the art will appreciate that there are many different ways to take these criteria into account and in assigning problem indices to hardware and software component interactions. For example, the index could be on a scale of 1 to 5 with 1 indicating few and minor problems, if any, and 5 indicating many and/or severe problems. Further, there generally are various categories of interactions between two hardware or software components. For example, two software applications may have problems associated their graphical representations on the display, communications problems, etc. Each category could be assigned a problem index and then the individual problem indices could be summed together to formulate an overall problem index 210.

In accordance with the preferred embodiment of the invention, a problem index 210 is assigned for each interaction of components discussed above. It should be noted that problems can exist with individual software or hardware components that do not result from that component interacting with other components. Such a problem, *e.g.*, the scanner entry in Figure 3, would still

be entered into the knowledge base 204 and assigned a problem index 210. In Figure 3, for example, software A, version 1 ("SWA V.1") and software B, version 1 ("SWB V.1") have a problem index of 11 while the scanner by itself has a problem index of 25.

Referring now to Figures 3 and 4, the configuration management module 202 preferably

5   performs method 202 which includes steps 252, 254, 256, and 258 (although step 252 may not be performed by the configuration management module). In 252, the configuration of the user's computer system 100 is determined. This step preferably is performed using any suitable software application known to those of ordinary skill in the art that can determine and report the complete configuration of a computer system. Most computers keep such information in a flash ROM (*e.g.*,

10   ROM 124 in Figure 1) or a file on a hard disk drive. The configuration information preferably includes all of the various software applications 142-150 loaded onto the computer's hard drive 130, and hardware components such as NIC 118, scanner 140, audio 114, and other devices. For each such software or hardware component, a version indicator is also included if any such indicator is available. For example, a software application XYZ may be available from the vendor

15   in two versions, version 1.0 and 2.0. The configuration information collected in step 252 includes such version information. The software configuration information preferably also includes the operating system and various device drivers used in the user's system. Further, hardware components may be available in various models. The scanner 140 may be available in various models from each potential supplier.

20   In step 254, the configuration management module 202 then uses the user's particular list of hardware and software components to determine an overall problem index value for that particular system. This can be done in any one of a variety of ways. For example, the configuration management module 202 may scan through the knowledge base and select problem

indices corresponding to hardware or software components or pairs of components that exist in the user's configuration and then add together the selected problem indices to determine the overall problem index.

In step 256, the configuration management module 202 determines whether a better (*i.e.,* more problem free) configuration is possible. The configuration management module 202 accomplishes this preferably by changing the version of the components in the user's configuration determined in step 252 and recalculating the problem index value and determining whether a configuration exists having a lower overall problem index value. In accordance with the preferred embodiment of the invention, the configuration management module 202 preferably does not vary the version of the hardware components because the user likely does not want to change the hardware. Further, the configuration management module 202 varies the configuration by keeping all of the software that the user's computer includes. The configuration management module 202 varies the versions of the software and recomputes the problem index for each such variation. For example, software application XYZ, version 1.0, may be changed to version 2.0 to determine if that change would result in a lower problem index.

There may be more than one configuration of components that have a lower overall problem index than the user's current configuration. The configuration having the lowest problem index, however, is preferable over the other configurations and thus, in step 258, the configuration management module 202 recommends the optimal configuration to the user. This recommendation may take any one of a variety of suitable forms. For example, the recommendation may be a list of instructions as to how the user should vary the software components in his or her computer to lower the problem index. The recommendation might also include downloading certain software programs and patches off a particular website. The user can

print out the recommendations and upgrade the computer at a later time. Alternatively, as noted above, some of the recommended upgrades may be simply downloading patches or new software versions off the Internet or ordering new software versions from a software vendors website. Accordingly, the user may be prompted to accept the recommendation and have the system begin

5 the upgrade automatically and immediately. If the user selects the automatic upgrade feature, the configuration management module 202 will download the software in the recommendation and/or facilitate the user ordering new versions of software from the supplier's website.

The configuration management module 202 and knowledge base 204 can exist on any suitable computer system. In accordance with the preferred embodiment of the invention, the

10 configuration management module 202 and knowledge base 204 preferably are accessible on a website on the Internet. As such, the knowledge base 204 can easily be maintained by an entity (*e.g.*, computer manufacturer) that tracks problems reported by its customers and software and hardware vendors. Alternatively, the configuration management module 202 and knowledge base 204 may not be accessible directly by individual computer users. Instead, a user may run the

15 software that determines and reports his or her configuration. That configuration information can be collected into a file which is sent (*e.g.*, email) to the entity that maintains and operates the configuration management module 202 and knowledge base 204. That entity can determine a more optimal configuration for the user and send back to the user the recommendation.

As described above, the preferred embodiment of the invention permits a user's computer

20 to be automatically evaluated and analyzed to determine if a more optimal set of software components is available. This alleviates the user from having to try different components until a configuration is found that seems to work better. The solution is faster and much easier on the user.

The above discussion is meant to be illustrative of the principles and various embodiments of the present invention. Numerous variations and modifications will become apparent to those skilled in the art once the above disclosure is fully appreciated. It is intended that the following claims be interpreted to embrace all such variations and modifications.

CLAIMS

What is claimed is:

1 1. A method of improving the configuration of a computer system, comprising:

2 (a) determining the current configuration of the computer system, said configuration

3 including hardware and software component information, the information including version

4 information;

5 (b) determining an overall problem index value associated with the current

6 configuration, said overall problem index value providing a relative indication of the problems in

7 the computer system;

8 (c) varying the configuration of the computer system; and

9 (d) determining an overall problem index value for the configuration as varied in (c).

1 2. The method of claim 1 further including:

2 (e) repeating (c) and (d) and selecting the configuration that has the lowest overall

3 problem index value.

1 3. The method of claim 2 further including recommending that a user reconfigure the system

2 to match the configuration selected in (e).

1 4. The method of claim 3 wherein (c) includes varying the version of each software

2 application in the configuration determined in (a).

1   5.   The method of claim 1 wherein (c) includes varying the version of each software

2   application in the configuration determined in (a).

1   6.   The method of claim 5 wherein (c) does not include varying the version of the hardware

2   components.

1   7.   The method of claim 1 wherein (b) and (d) includes selecting individual problem index

2   values from a knowledge base.

1   8.   The method of claim 7 further including adding together said individual problem index

2   values to determine said overall problem index value for the configuration.

1   9.   The method of claim 1 wherein said overall problem index value is an indication of the

2   number of problems associated with said configuration.

1   10.   The method of claim 1 wherein said overall problem index value is an indication of the

2   severity of problems associated with said configuration.

1   11.   The method of claim 1 wherein said overall problem index value is an indication of the

2   number of problems and the severity of the problems associated with said configuration.

1   12.   A computer system, comprising:

2   a configuration management module;

3   a knowledge base that interacts with said configuration management module; and

4   said configuration management module determines a configuration for a computer user that

5 has fewer problems than the user's current configuration of hardware and software components.

1   13.   The computer system of claim 12 wherein the configuration management module receives

2 the current configuration of the user's computer system, said current configuration includes

3 hardware and software components and versions of said hardware and software components,

4 determines an overall problem index value associated with the current configuration, said overall

5 problem index value providing a relative indication of the problems in the computer system, varies

6 the configuration of the computer system to produce a new configuration, and determines an

7 overall problem index value for the new configuration.

1   14.   The computer system of claim 13 wherein said configuration management module selects

2 the configuration that has the lowest overall problem index value.

1   15.   The computer system of claim 14 wherein said configuration management module

2 recommends that a user reconfigure the system to match the configuration selected as having the

3 lowest overall problem index value.

1   16.   The computer system of claim 15 wherein said configuration management module varies

2 the version of each software application in the configuration.

1   17.   The computer system of claim 13 wherein said configuration management module varies

2   the version of each software application in the configuration.

1   18.   The computer system of claim 17 wherein said configuration management module varies

2   does not vary the version of the hardware components.

1   19.   The computer system of claim 13 wherein (b) and (d) includes selecting individual problem

2   index values from a knowledge base.

1   20.   The computer system of claim 19 further including adding together said individual problem

2   index values to determine said overall problem index value for the configuration.

1   21.   The computer system of claim 13 wherein said overall problem index value is an indication

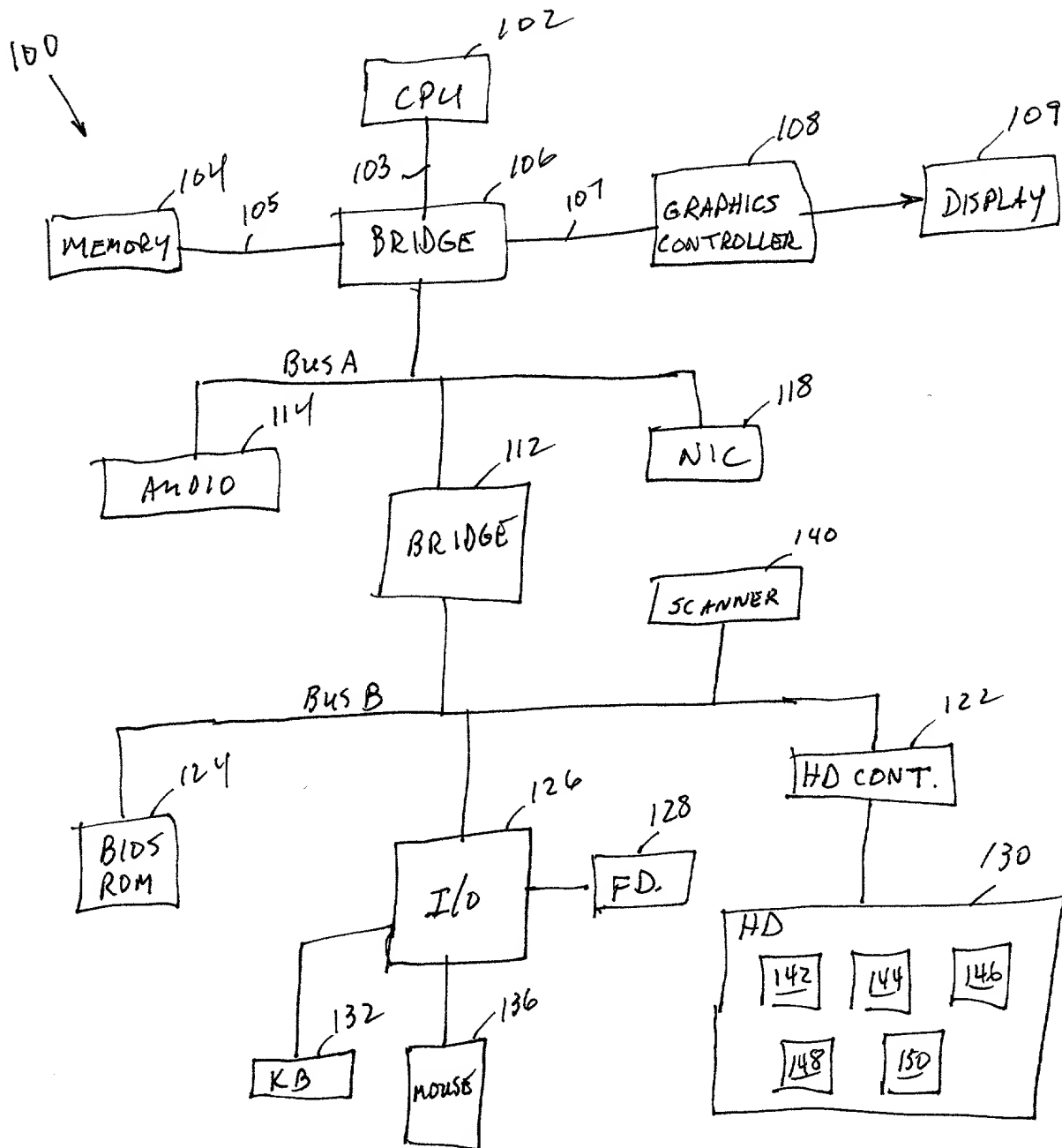2   of the number of problems associated with said configuration.

1   22.   The computer system of claim 1 wherein said overall problem index value is an indication

2   of the severity of problems associated with said configuration.

1   23.   The computer system of claim 1 wherein said overall problem index value is an indication

2   of the number of problems and the severity of the problems associated with said configuration.

1   24.   The computer system of claim 12 wherein said knowledge base includes a collection of

2   problems that have been identified for various hardware or software components.

ABSTRACT

An automatic configuration system automatically analyzes a user's computer system configuration and recommends a more optimal configuration of components. The system determines the hardware and software components currently contained in the user's computer including versions of hardware and software components. The system uses a knowledge base of previously identified problems to determine an overall problem index value for the user's particular configuration. Generally, the overall problem index value is generally indicative of the quantity and/or severity of the problems associated with the user's computer. The automatic configuration system then varies the configuration (*e.g.*, the versions of software) and determines a new overall problem index value for each variation. The system selects the configuration with the lowest overall problem index value, which generally will have the fewest and/or less severe problems and recommends that configuration to the user.

100

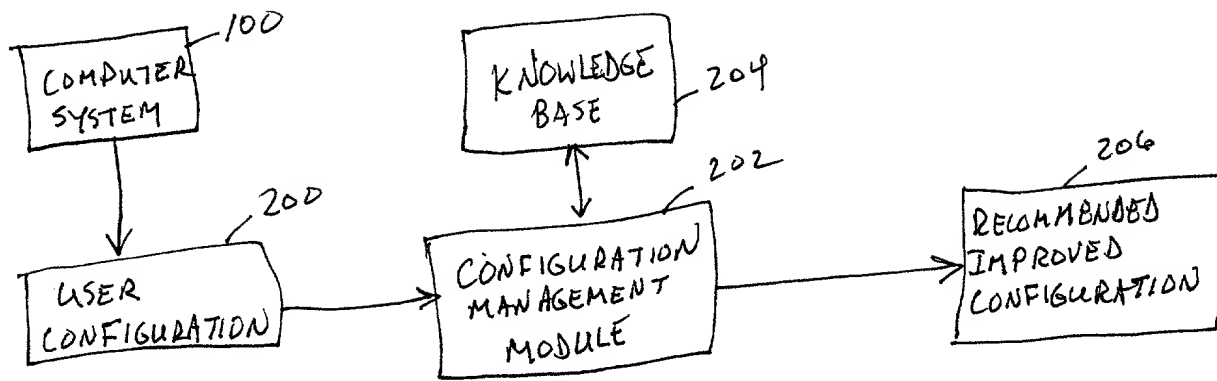102
CPU

104
MEMORY
105
103
106
BRIDGE
107

108
GRAPHICS
CONTROLLER

109
DISPLAY

Bus A

114
AUDIO

112
BRIDGE

118
NIC

140
SCANNER

Bus B

124
BIOS
ROM

126
I/O

128
FD.

122
HD CONT.

130
HD
142 144 146
148 150

132
KB

136
MOUSE

FIG.1

COMPUTER
SYSTEM
100

KNOWLEDGE
BASE
204

USER
CONFIGURATION
200

CONFIGURATION
MANAGEMENT
MODULE
202

RECOMMENDED
IMPROVED
CONFIGURATION
206

FIG. 2

204

INTERACTIONS	PROBLEM INDEX	COMMENTS
SWA V.1/SWB V.1	11 ~210	212
SWA V.2/SWB V.1	8	
SWA V.2/SWB V.2	12	
SCANNER	25	
SWB V.1/SWC V.1	2	

208

⋮

FIG. 3

250

252

DETERMINE USER CONFIGURATION

254

DETERMINE OVERALL PROBLEM INDEX
FOR EXISTING CONFIGURATION

256

CHANGE COMPONENT VERSIONS AND
DETERMINE OVERALL PROBLEM INDEX
FOR EACH NEW CONFIGURATION

258

RECOMMEND CONFIGURATION WITH
LOWEST OVERALL PROBLEM INDEX
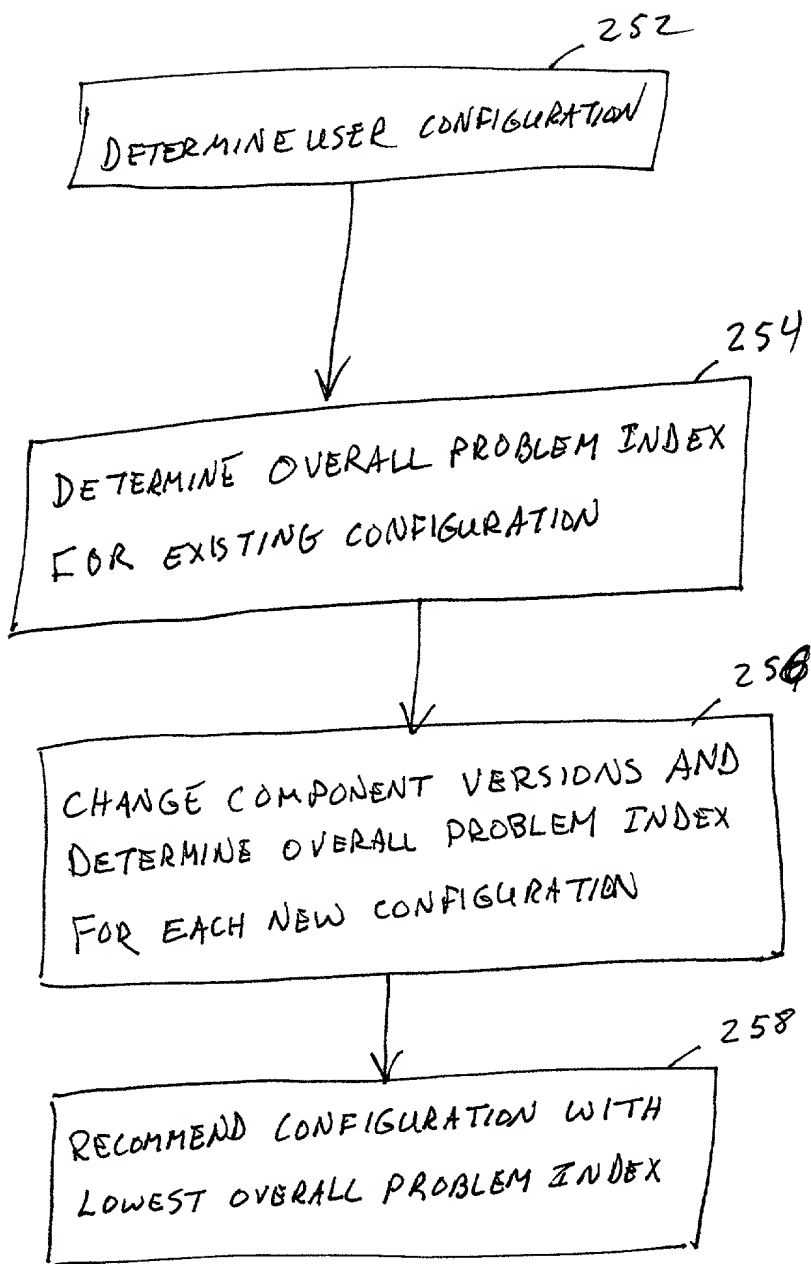
FIG. 4

DECLARATION   **SOLE/JOINT INVENTOR**
ORIGINAL/SUBSTITUTE/CIP

As a below named inventor, I hereby declare that: my residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first, and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **"AUTOMATIC SYSTEM CONFIGURATION MANAGEMENT"**, as described in the specification attached.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above; that I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application; that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representative or assigns more than twelve months prior to this application; and that I acknowledge the duty to disclose information of which I am aware which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations § 1.56(a). Such information is material when it is not cumulative to information already of record or being made of record in the application, and
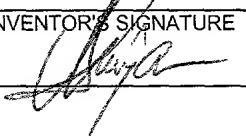
    (1) it establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
    (2) it refutes, or is inconsistent with, a position the applicant has taken or may take in:

        (i) opposing an argument of unpatentability relied on by the Office, or
        (ii) asserting an argument of patentability.

I hereby claim foreign priority benefits under Title 35, United States Code § 119 of any foreign application(s) for patent or inventor's certificates listed below and have also identified below any foreign application(s) having a filing date before that of the application(s) on which priority is claimed:

COUNTRY	APPLICATION NUMBER	DATE OF FILING	PRIORITY CLAIMED UNDER 35 USC 119
			☐ YES ☐ NO

I hereby claim the benefit under Title 35 United States Code § 120 of any United States application(s) listed below and, insofar as any subject matter of any claim of this application is not disclosed in the prior United States Application, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations § 1.56(a) which occurred between the filing date of the prior application and the national PCT international filing date of this application:

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF SOLE OR FIRST INVENTOR	INVENTOR'S SIGNATURE	DATE
Adrian CRISAN		9/29/2000
RESIDENCE		CITIZENSHIP
13806 Quail Forest, Cypress, Texas, 77429		**U.S.A.**
POST OFFICE ADDRESS		
SAME AS ABOVE		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Adrian CRISAN	§
		§
Serial No.:	Not Yet Assigned	§
		§
Filed:	Concurrently Herewith	§
		§
For:	Automatic System Configuration	§
	Management	§

POWER OF ATTORNEY BY ASSIGNEE

Under the provisions of 37 C.F.R. § 3.71, the undersigned assignee of record of the entire interest in the above-identified patent/patent application by virtue of an assignment recorded (check as applicable):

☒ Concurrently herewith
☐ Date Recorded
☐ Reel _____ Frame _____

elects to conduct the prosecution of the application/maintenance of the patent to the exclusion of the inventor(s). The undersigned hereby declares that she has reviewed the above-referenced assignment and hereby declares that, to the best of her knowledge, title is in the Assignee, and she is empowered to sign on behalf of the Assignee, and further declares that all statements made herein of her own knowledge are true and that all statements made on information and belief are believed to be true. The assignee hereby revokes any previous powers of attorney and appoints the following to prosecute this application/maintain this patent and transact all business in the Patent and Trademark Office connected therewith:

Kevin L. Daffer	34,146	Irene Kosturakis	33,724
Michael F. Heim	32,702	Keith Lutsch	31,851
David A. Rose	26,223	Joseph Arrambide	39,589
Marcella D. Watkins	36,962	Sarah T. Harris	35,891
Bruce Noël Kivlin	33,929	Richard P. Lange	27,296
Jonathan M. Harris	44,144	Theodore S. Park	26,971
Mark E. Scott	43,100	Lou Brucculeri	38,834
Robert C. Kowert	39,255	Jeffrey C. Hood	35,198

Please direct all communications to: Conley, Rose & Tayon, P. O. Box 3267, Houston, Texas 77253-3267, Telephone No. (713) 238-8000, to the attention of: **JONATHAN M. HARRIS.**

ASSIGNEE
COMPAQ COMPUTER CORPORATION

Date: 29 Sept. 2000   BY: _Diane H. Strong_

NAME: Diane H. Strong
TITLE: Administrator, Patents

Authorized To Sign This Document On Behalf Of
Compaq Computer Corporation
Pursuant To Board Of Directors Resolution
Date July 28, 1989